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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Art Unit: 1792
Yasushi ENOKIDO et al.	Examiner: G. Nagesh Rao
Serial No.: 10/530,220	
Confirmation No.: 1260	
Filed: October 24, 2005	
For: TWO-DIMENSIONAL PHOTONIC CRYSTAL	

DECLARATION UNDER 37 CFR 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

We, Yasushi ENOKIDO and Isao NAKAHATA, hereby declare as follows:

Claims 1 and 18 of the present invention recites that "said first dielectric region is arranged so that the midpoint of said shorter side XI and the midpoint of said longer side Y1 and the center of said rectangular cross section substantially coincide". This means, as shown in FIG. 3A, on each one of the shorter sides X1 of a unit lattice one first dielectric region is arranged such that the center of a first dielectric region disposed on a shorter side X1 substantially coincides with the midpoint of that shorter side X1, and the center of a first dielectric region disposed on a longer side Y1 substantially coincides with the midpoint of that longer side Y1. As shown in FIG. 2, the first dielectric regions (rectangular column structures) are erected on sides parallel to the Y direction of sides making up equilateral hexagons virtually arranged in a honeycomb form on the photonic crystal.

In contrast, the center of a dielectric rod of Jasper reference (U.S. Patent No. 5,739,796) coincides with the angle vertex and not with the midpoint, of a unit lattice

as indicated on the drawing Appendix A, showing dielectric rods constituting a first sub-crystal and a second subcrystal and arranged on a unit lattice. Appendix A illustrates Jasper's two-dimensional photonic crystal and is based on the disclosure of column 6, lines 20-50.

Furthermore, claim 1 of the present invention also recites that "the unit lattice being a rectangle" and "the dielectric regions each being columnar and having a rectangular cross section".

In contrast, Shirane (U.S. Patent App. Pub. No. 2002/0146196A1) teaches that the i-type semiconductor is cylindrical and arranged in a two-dimensional triangular lattice *(See Shirane; Page 3, paragraph 0048).* Shirane suggests a square lattice or a regular hexagonal lattice *(See Shirane; Page 4, paragraph 0062)* but does not teach how the i-type semiconductors are arranged in such lattices. However, the center of the i-type semiconductor would also coincide with the vertex of such square or regular hexagonal lattices because the center of the i-type semiconductor coincides with the vertex, and not with the midpoint, of the triangular lattice.

Moreover, claims 12 and 19 of the present invention recites that "a line segment Lx linking centers of two of said first dielectric regions adjoining in an X direction and a line segment Ly linking centers of two of said first dielectric regions adjoining in a Y direction orthogonal to said X direction are substantially orthogonal to each other substantially at their midpoints, the ratio between the length x3 of said line segment Lx and the length y3 of said line segment Ly equals 1: substantially $\sqrt{3}$." Neither Jasper nor Shirane disclose or suggest this feature.

Accordingly, Jasper and Shirane fail to teach not only the ratio of the x1 and the y1 values (as conceded by the Examiner), but also the structural characteristics of a two-dimensional photonic crystal of the present invention as described above, especially the underlined characteristics.

Moreover, claims 18 and 19 of the present invention recite that "said dielectric material is a $BaO\text{-}TiO_2$ based dielectric material or $BaO\text{-}Nd_2O_3\text{-}TiO_2$ based dielectric

material". Jasper does not disclose a dielectric material comprising Nd_2O_3. Shirane does not disclose any dielectric material.

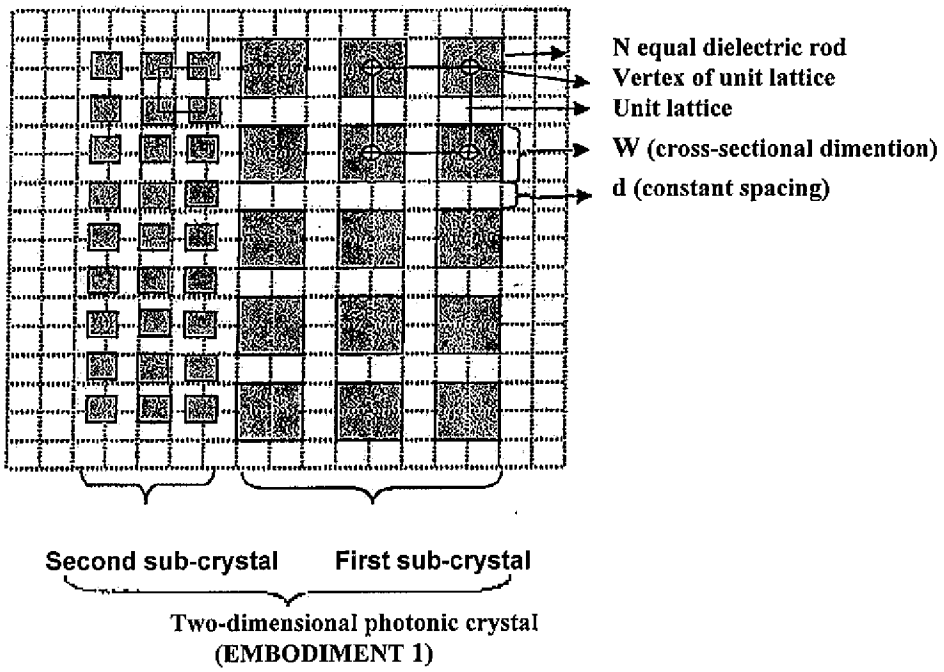
Furthermore, claims 1 and 12 of the present invention recite that "said two dimensional-photonic crystal has a full band gap width of 22.5% or greater."

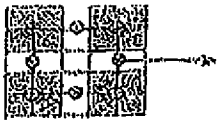
Jasper does not disclose a photonic crystal having a full and gap (a band gap for both TE and TM waves) width of 22.5% or greater. Jasper's photonic crystal produces a stop band with more than a 20% band gap, but achieves a smaller band gap for TM waves *(See Jasper; Column 6, lines 43-45, 66-67)*. Shirane does not disclose a photonic-crystal having a full band gap of 22.5% or greater.

Thus, routine experimentation by those of ordinary skill in the art would not result in the claimed invention or be expected to produce the effects of the claimed invention. Thus, the claimed invention produces results that are not expected and which are substantially distinguishing from the prior art of record.

APPENDIX A

Jasper's photonic crystal





Midpoint of unit lattice
(which does not coincide with the center of dielectric rod)

The undersigned, having been warned that willful false statements and the like are punishable by fine or imprisonment, or both, and may jeopardize the validity of this application or any patent issuing therefrom, hereby declare that all statements made of their own knowledge are true and that all statements made on information and belief are believed to be true.

Inventor's Signature _____ Date: 6/16/2008

Yasushi ENOKIDO

Inventor's Signature _____ Date: 6/16/2008

Isao NAKAHATA